Job No: QECD/BBMP/YNK/QC-15/2019-2020/01

Test Report

Project Name	:	Improvements to Main and Cross Road at Bharth Gowda Layout and GKVK Layout in Kempegowda Ward No-01 of Yelahanka Sub Division.
Client	:	The Asst Executive Engineer, Yelahanka Sub Division
Mix Type	:	Granular sub Base
Contractor	:	Sri.Keerthi N
Test Method	:	IS : 2386 (Part - 1) 1963 & Specification for Road & Bridge Works, MORT&H, Rev. V.
Location	:	Bharth Gowda Layout
Material	:	40mm Coarse Aggregates
Sample No	:	1
Date	:	6-Jul-2020

Weight of Sample: 4000 gms

Aggregate Gradation Test

Sl. No.	I.S. Sieve size (mm)	Weight Retained (gm)	Percentage of weight Retained (%)	Cumulative Percentage of weight retained	Cumulative % of Passing		Remarks
					Test Result	Gradation Limits as per MORT&H	
1	75	0	0	0.00	100	100	Gradation satisfies the MORT&H Specification for GSB
2	53	400	10.00	10.00	90.00	80-100	
3	26.5	700	17.50	27.50	72.50	55-90	
4	9.5	900	22.50	50.00	50.00	35-65	
5	4.75	400	10.00	60.00	40.00	25-55	
6	2.36	400	10.00	70.00	30.00	20-40	
7	0.425	700	17.50	87.50	12.50	10-15	
8	0.075	400	10.00	97.50	2.50	<5	

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Job No: QECD/BBMP/YNK/QC-15/2019-2020/01

Test Report

Project Name	:	Improvements to Main and Cross Road at Bharth Gowda Layout and GKVK Layout in Kempegowda Ward No-01 of Yelahanka Sub Division.
Client	:	The Asst Executive Engineer, Yelahanka Sub Division
Mix Type	:	Granular sub Base
Contractor	:	Sri.Keerthi N
Test Method	:	Specification for Road & Bridge Works, MORT&H, Rev. V.
Location	:	Bharth Gowda Layout
Material	:	40mm Coarse Aggregates
Sample No	:	1
Date	:	6-Jul-2020

Liquid and Plastic Limit by Cone Apparatus

Sl No	Description	Unit	Liquid Limit	Plastic Limit
	Penetration	mm	Non Plastic	Non Plastic
1	Container No	no		
2	Weight of container,(A)	gm		
3	Weight of container + wet soil, (B)	gm		
4	Weight of container + dry soil, (C)	gm		
5	Weight of water, D=(B - C)	gm		
6	Weight of dry soil, E=(C - A)	gm		
7	Water Content, D/E x 100 (%)	gm		

Comments: <6 so Non Plastic

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Test Report

Project Name : Improvements to Main and Cross Road at Bharth Gowda Layout and GKVK Layout in Kempegowda Ward No-01 of Yelahanka Sub Division.

Client : The Asst Executive Engineer, Yelahanka Sub Division

Mix Type : Wet Mix Macadam

Contractor : Sri.Keerthi N

Location : Bharth Gowda Layout

Material : Bitumen

Sample No : 1

Date : 15-Jul-2020

Rate of Spread of Prime Coat

Sl. No.	Determination	Unit	Test No 1		
			Longitudinal Distribution		
1	Size of Plate (mxn)	m^2	0.2x0.2	0.2x0.2	0.2x0.2
2	Area of the Plate (a)	m^2	0.04	0.04	0.04
3	Initial weight of the empty Plate (b)	kg	1.641	1.641	1.641
4	Final weight of plate after application of Tack Coat (c)	kg	1.696	1.651	1.653
5	Weight of Prime coat/ Tack Coat (d = c-b)	kg	0.055	0.01	0.012
6	Rate of spread (d/a)	kg / m^2	1.375	0.250	0.300
7	Average	kg / m^2	0.642		
8	Specified Limit	kg / m^2	Not less than 0.6 kg / m^2		

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Results: Rate of Spread of Prime Coat / Tack Coat is: 0.642 kg / m2

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Job No: QECD/BBMP/YNK/QC-15/2019-2020/01

Test Report

Project Name	:	Improvements to Main and Cross Road at Bharth Gowda Layout and GKVK Layout in Kempegowda Ward No-01 of Yelahanka Sub Division.
Client	:	The Asst Executive Engineer, Yelahanka Sub Division
Mix Type	:	Wet Mix Macadam
Contractor	:	Sri.Keerthi N
Material	:	Coarse Aggregate
Test Method	:	IS : 2386 (Part - 4) 1963 & Specification for Road & Bridge Works, MORT&H, Rev. V.
Location	:	Bharth Gowda Layout
Sample No	:	1
Date	:	14-Jul-2020

Aggregate Impact Value

Sl. No.	Determination	Unit	Trails	
1	Weight of empty cylinder, w1	gm	1000.00	1000.00
2	Weight of container filled with Aggregate, w2	gm	1300.00	1301.00
3	Weight of the Aggregate before compaction, (w2 - w1) = w3	gm	300.00	301.00
4	Weight of the sample passing through 2.36 mm IS sieves after Impact, w4	gm	79.00	80.00
5	Weight of the sample retained on 2.36 mm IS sieve after Impact, w5	gm	221.00	221.00
6	Aggregate Impact Value (w4 / w3)x100	%	26.33	26.58
7	Specified Limit	%	30.00	

Results: Average Aggregate Impact Value = **26.46 %**

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Test Report

Project Name	:	Improvements to Main and Cross Road at Bharth Gowda Layout and GKVK Layout in Kempegowda Ward No-01 of Yelahanka Sub Division.
Client	:	The Asst Executive Engineer, Yelahanka Sub Division
Mix Type	:	Wet Mix Macadam
Contractor	:	Sri.Keerthi N
Test Method	:	IS: 2720 (Part - 16) 1963 & Specification for Road & Bridge Works, MORT&H, Rev. V.
Location	:	Bharth Gowda Layout
Material	:	Wet Mix Macadam
Sample No	:	1
Date	:	15-Jul-2020

Field Density Test by Sand Replacement Method

MDD	2.24
OMC in %	3.20
Bulk Density Ys	1.39
Weight of Sand In cone W1 (gm)	1195.00
Weight Of Wet soil From Hole (W2)	4280.00
Wt Of Sand +Cylinder Before Pouring (W3)gm	17000.00
Wt Of Sand +Cylinder After Pouring (W4) gm	13180.00
Wt Of Sand In Hole: W5 = W3 - W4- W1 (gm)	2625.00
Volume of Hole: V= W5/ Ys	1885.78
Bulk Density Yb= W2/V (gm/cc)	2.27
Moisture Meter Reading (%)	1.50
Moisture Content : w (From Graph In %)	3.22
Dry Density Yd = Yb/(1+W/100)	2.20
Field Compaction(%)	98.16

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Test Report

Project Name	Improvements to Main and Cross Road at Bharth Gowda Layout and GKVK Layout in Kempegowda Ward No-01 of Yelahanka Sub Division.
Client	The Asst Executive Engineer, Yelahanka Sub Division
Mix Type	Dense Graded Bituminous Macadam
Contractor	Sri.Keerthi N
Test Method	IS : 73 – 1992 & Specification for Road & Bridge Works, MORT&H, Revision IV.
Grade of Bitumen	60 / 70
Location	Hot Mix Plant
Material	Bitumen
Sample No	1
Date	1-Aug-2020

Quality of Bitumen

Sl. No.	Description	Test Results	Requirement as per IS:73 - 1992
1	Penetration at 25^{0}C , 1 / 10 mm	65	60 – 70
2	Softening Point, (^{0}C)	49	45 – 55
3	Specific Gravity	1.1	Min. 0.97
4	Ductility at 27^{0}C, in cm	80	Min. 75
5	Flash Point, (^{0}C)	183	Min. 175

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Test Report

Project Name	Improvements to Main and Cross Road at Bharth Gowda Layout and GKVK Layout in Kempegowda Ward No-01 of Yelahanka Sub Division.
Client	The Asst Executive Engineer, Yelahanka Sub Division
Mix Type	Dense Graded Bituminous Macadam
Contractor	Sri.Keerthi N
Location	Bharth Gowda Layout
Material	Bitumen
Sample No	1
Date	6-Aug-2020

Rate of Spread of Tack Coat

Sl. No.	Determination	Unit	Test No 1		
			Longitudinal Distribution		
1	Size of Plate (mxn)	m^2	0.2x0.2	0.2x0.2	0.2x0.2
2	Area of the Plate (a)	m^2	0.04	0.04	0.04
3	Initial weight of the empty Plate (b)	kg	1.641	1.641	1.641
4	Final weight of plate after application of Tack Coat (c)	kg	1.653	1.651	1.653
5	Weight of Prime coat/ Tack Coat (d = c-b)	kg	0.012	0.01	0.012
6	Rate of spread (d/a)	kg / m^2	0.300	0.250	0.300
7	Average	kg / m^2	0.283		
	Specified Limit	kg / m^2	Not less than 0.25 kg / m^2		

Results: Rate of Spread of Prime Coat / Tack Coat is: 0.283 kg / m2

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Test Report

Project Name	Improvements to Main and Cross Road at Bharth Gowda Layout and GKVK Layout in Kempegowda Ward No-01 of Yelahanka Sub Division.
Client	The Asst Executive Engineer, Yelahanka Sub Division
Mix Type	Dense Graded Bituminous Macadam
Contractor	Sri.Keerthi N
Test Method	IS : 6241 - 1971 & Specification for Road & Bridge Works, MORT&H, Revision V.
Location	Hot Mix Plant
Material	Coarse Aggregates / Bitumen
Sample No	1
Date	1-Aug-2020
Type of Aggregate	Coarse Aggregate
Type of Binder	60 / 70 Grade
Percentage of Binder Used	5% by weight
Total weight of Aggregate	200 gms
Total weight of Binder	10 gms
Temperature of water bath	40^0C

Aggregate Stripping Value

Observation Number	Stripping Percentage	Average Percentage	Average Retained Coating (%)
1	3.2	3.23	96.77
2	3.3		
3	3.2		

Comments: Minimum allowable Aggregate Stripping Value for Dense Bituminous Macadam is 95%

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Test Report

Project Name	Improvements to Main and Cross Road at Bharth Gowda Layout and GKVK Layout in Kempegowda Ward No-01 of Yelahanka Sub Division.
Client	The Asst Executive Engineer, Yelahanka Sub Division
Mix Type	Dense Graded Bituminous Macadam
Contractor	Sri.Keerthi N
Test Method	IS: 2386 (Part - 111) 1963 & Specification for Road & Bridge Works, MORT&H, Rev V
Location	Hot Mix Plant
Material	Coarse Aggregates
Sample No	1
Date	1-Aug-2020

Specific Gravity and Water Absorption

Sl. No.	Particulars	Computations	Test Numbers		Mean
			Test 1	Test 2	
1	Weight of Empty Basket Immersed in Water	W_1 g	761	763	
2	Wt of Basket Filled with Aggregates Immersed in water	W_2g	2024	2022	
3	Weight of Saturated Aggregate in water	W_3g = W_2- W_1	1263	1259	
4	Weight of saturated surface dry aggregate in Air	W_3 g	2059	2047	
5	Weight of water equal to the Volume of the Aggregate	W_3- W_s	796	788	
6	Weight of Oven dried Aggregate	W_4g	2020	2018	
7	Specific Gravity	W_4/(W_3- W_s)	2.54	2.56	2.55
8	Apparent Specific Gravity	W_4/(W_4- W_s)	2.67	2.66	2.66
9	Water Absorption	(W_4- W_s)*100/ W_4	1.93	1.44	1.69

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Comments: Maximum allowable Aggregate Water Absorption value for Dense bituminous Macadam is 2.0%.

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Test Report

Project Name	Improvements to Main and Cross Road at Bharth Gowda Layout and GKVK Layout in Kempegowda Ward No-01 of Yelahanka Sub Division.
Client	The Asst Executive Engineer, Yelahanka Sub Division
Mix Type	Dense Graded Bituminous Macadam
Contractor	Sri.Keerthi N
Test Method	Specification for Road & Bridge Works, MORT&H, Revision V.
Location	Bharth Gowda Layout
Sample No	1
Date	6-Aug-2020

Stability of Mix

Sl. No.	Description	Unit	Test 1	Requirements as per MORT&H
1	Marshal Stability	KN	9.7	9 KN (min)
2	Marshal Flow	mm	3.5	2 – 5 mm
3	Percent of Air Voids in mix	%	4.35	3-5..
4	Percent of Voids in Mineral Aggregates filled with Bitumen	%	71.5	65 – 75 %
5	Density	g/cc	2.22	2.22 g/cc

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Test Report
Binder Content and Mix Gradation

Project Name	Improvements to Main and Cross Road at Bharth Gowda Layout and GKVK Layout in Kempegowda Ward No-01 of Yelahanka Sub Division.
Client	The Asst Executive Engineer, Yelahanka Sub Division
Mix Type	Dense Graded Bituminous Macadam
Contractor	Sri Keerthi N
Test Method	Specification for Road & Bridge Works, MORT&H, Revision V.
Location	Bharth Gowda Layout
Sample No	1
Date	6-Aug-2020

Sl. No.	Description	Unit	Computation	Test Result
1	Weight of Empty bowl before Extraction (E)	gm	Eb	1080
2	Weight of bowl + Sample before extraction (w_s)	gm	w_{sb}	1745
3	Weight of Sample taken for the test (S_b)	gm	$S_b = w_{sb} - Eb$	665
4	Weight of bowl + Sample after extraction (w_a)	gm	w_{sa}	1712
5	Weight of Sample after extraction (i.e. washed aggregates) (S_a)	gm	$S_a = w_{sa} - Eb$	632
6	Weight of Filter paper before extraction (F_b)	gm	F_b	2
7	Weight of Filter paper after extraction (F_a)	gm	F_a	4
8	Weight of filler on filter paper (F_d)	gm	$F_d = F_b - F_a$	2
9	Weight of Bitumen without considering Filter paper (W_b)	gm	W_b	33
10	Weight of the Bitumen with considering Filter paper (W_a)	gm	$W_a = w_b - F_d$	31
11	Percentage of the Bitumen (i.e. Binder Content) (%$_b$)	(%)	W_a/ SbX100	4.66

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Test Report

Project Name	Improvements to Main and Cross Road at Bharth Gowda Layout and GKVK Layout in Kempegowda Ward No-01 of Yelahanka Sub Division.
Client	The Asst Executive Engineer, Yelahanka Sub Division
Mix Type	Bituminous Concrete (BC)
Contractor	Sri.Keerthi N
Test Method	IS : 73 – 1992 & Specification for Road & Bridge Works, MORT&H, Revision IV.
Grade of Bitumen	60 / 70
Location	Hot Mix Plant
Material	Bitumen
Sample No	1
Date	2-Aug-2020

Quality of Bitumen

Sl. No.	Description	Test Results	Requirement as per IS:73 - 1992
1	Penetration at 25^{0}C , 1 / 10 mm	65	60 – 70
2	Softening Point, (^{0}C)	54	45 – 55
3	Specific Gravity	1.1	Min. 0.97
4	Ductility at 27^{0}C, in cm	80	Min. 75
5	Flash Point, (^{0}C)	184	Min. 175

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Test Report

Project Name	Improvements to Main and Cross Road at Bharth Gowda Layout and GKVK Layout in Kempegowda Ward No-01 of Yelahanka Sub Division.
Client	The Asst Executive Engineer, Yelahanka Sub Division
Mix Type	Bituminous Concrete (BC)
Contractor	Sri.Keerthi N
Location	Bharth Gowda Layout
Material	Bitumen
Sample No	1
Date	7-Aug-2020

Rate of Spread of Tack Coat

Sl. No.	Determination	Unit	Test No 1		
			Longitudinal Distribution		
1	Size of Plate (mxn)	m^2	0.2x0.2	0.2x0.2	0.2x0.2
2	Area of the Plate (a)	m^2	0.04	0.04	0.04
3	Initial weight of the empty Plate (b)	kg	1.641	1.641	1.641
4	Final weight of plate after application of Tack Coat (c)	kg	1.653	1.651	1.653
5	Weight of Prime coat/ Tack Coat (d = c-b)	kg	0.012	0.01	0.012
6	Rate of spread (d/a)	kg / m^2	0.300	0.250	0.300
7	Average	kg / m^2	0.283		
8	Specified Limit	kg / m^2	Not less than 0.25 kg / m^2		

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Results: Rate of Spread of Prime Coat / Tack Coat is: 0.283 kg / m2

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Test Report

Project Name	Improvements to Main and Cross Road at Bharth Gowda Layout and GKVK Layout in Kempegowda Ward No-01 of Yelahanka Sub Division.
Client	The Asst Executive Engineer, Yelahanka Sub Division
Mix Type	Bituminous Concrete (BC)
Contractor	Sri.Keerthi N
Test Method	IS : 2386 (Part - 1) 1963 & Specification for Road & Bridge Works, MORT&H, Rev. V.
Location	Hot Mix Plant
Material	Coarse Aggregates
Sample No	1
Date	6-Aug-2020

Aggregate Particle Shape

I.S. Sieves Size			Flakiness Index		Elongation Index	
Passing through IS Sieves (mm)	Retained on IS Sieves (mm)	Weight of Retained Sample on Each Sieve (minimum 200 Pieces) (gm)	Thickness Gauge	Weight of Aggregates in each fraction passing on thickness gauges (gm)	Length Gauge	Weight of Aggregates in Fraction retained on length gauges (gm)
63	50	0	33.9	0	-	0
50	40	0	27	0	81	0
40	25	0	19.5	0	58.5	0
31.5	25	0	16.95	0	-	0
25	20	1556	13.5	236	40.5	254
20	16	1442	10.8	121	32.4	148
16	12.5	952	8.55	147	25.6	154
12.5	10	468	6.75	70	20.2	76
10	6.3	230	4.89	52	14.7	59
	SW	4648	SWf	626	SWe	691

Flakiness Index 13.47 %
Elongation Index 14.87 %
Combined Flakiness and Elongation Indices : 28.33 %

Comments: Maximum allowable Combined Flakiness and Elongation Indices for Bituminous Concrete is 35%.

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Test Report

Project Name	Improvements to Main and Cross Road at Bharth Gowda Layout and GKVK Layout in Kempegowda Ward No-01 of Yelahanka Sub Division.
Client	The Asst Executive Engineer, Yelahanka Sub Division
Mix Type	Bituminous Concrete (BC)
Contractor	Sri.Keerthi N
Test Method	IS : 6241 - 1971 & Specification for Road & Bridge Works, MORT&H, Revision V.
Location	Hot Mix Plant
Material	Coarse Aggregates / Bitumen
Sample No	1
Date	2-Aug-2020
Type of Aggregate	Coarse Aggregate
Type of Binder	60 / 70 Grade
Percentage of Binder Used	5% by weight
Total weight of Aggregate	200 gms
Total weight of Binder	10 gms
Temperature of water bath	40^0C

Aggregate Stripping Value

Observation Number	Stripping Percentage	Average Percentage	Average Retained Coating (%)
1	3.2	3.23	96.77
2	3.3		
3	3.2		

Comments: Minimum allowable Aggregate Stripping Value for Bituminous Concrete is 95%

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Project Management Services

Job No: QECD/BBMP/YNK/QC-15/2019-2020/01

Test Report

Project Name	Improvements to Main and Cross Road at Bharth Gowda Layout and GKVK Layout in Kempegowda Ward No-01 of Yelahanka Sub Division.
Client	The Asst Executive Engineer, Yelahanka Sub Division
Mix Type	Bituminous Concrete (BC)
Contractor	Sri.Keerthi N
Test Method	IS: 2386 (Part - III) 1963 & Specification for Road & Bridge Works, MORT&H, Rev. V.
Location	Hot Mix Plant
Material	Coarse Aggregates
Sample No	1
Date	2-Aug-2020

Specific Gravity and Water Absorption

Sl. No.	Particulars	Computations	Test Numbers		Mean
			Test 1	Test 2	
1	Weight of Empty Basket Immersed in Water	W_1 g	761	763	
2	Wt of Basket Filled with Aggregates Immersed in water	W_2g	2024	2022	
3	Weight of Saturated Aggregate in water	W_3g = W_2- W_1	1263	1259	
4	Weight of saturated surface dry aggregate in Air	W_3 g	2059	2047	
5	Weight of water equal to the Volume of the Aggregate	W_3- W_4	796	788	
6	Weight of Oven dried Aggregate	W_4g	2020	2018	
7	Specific Gravity	W_4/(W_3- W_4)	2.54	2.56	2.55
8	Apparent Specific Gravity	W_4/(W_4- W_5)	2.67	2.66	2.66
9	Water Absorption	(W_4- W_3)*100/ W_4	1.93	1.44	1.69

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Comments: Maximum allowable Aggregate Water Absorption value for Bituminous Concrete is 2.0%.

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Test Report

Project Name	Improvements to Main and Cross Road at Bharth Gowda Layout and GKVK Layout in Kempegowda Ward No-01 of Yelahanka Sub Division.
Client	The Asst Executive Engineer, Yelahanka Sub Division
Mix Type	Bituminous Concrete (BC)
Contractor	Sri.Keerthi N
Test Method	Specification for Road & Bridge Works, MORT&H, Revision V.
Location	Bharth Gowda Layout
Material	Bituminous Concrete mix
Sample No	1
Date	7-Aug-2020

Binder Content and Mix Gradation

Sl. No.	Description	Unit	Computation	Test Result
1	Weight of Empty bowl before Extraction (E)	gm	Eb	1080
2	Weight of bowl + Sample before extraction (w_s)	gm	w_{sb}	1740
3	Weight of Sample taken for the test (S_b)	gm	$S_b = w_{sb} - Eb$	660
4	Weight of bowl + Sample after extraction (w_s)	gm	w_{sa}	1707
5	Weight of Sample after extraction (i.e. washed aggregates)	gm	$S_a = w_{sa} - Eb$	627
6	Weight of Filter paper before extraction (F_b)	gm	F_b	2
7	Weight of Filter paper after extraction (F_a)	gm	F_a	4
8	Weight of filler on filter paper (F_d)	gm	$F_d = F_b - F_a$	2
9	Weight of Bitumen without considering Filter paper (W_b)	gm	W_b	42
10	Weight of the Bitumen with considering Filter paper (W_a)	gm	$W_a = w_b - F_d$	40
11	Percentage of the Bitumen (i.e. Binder Content) ($\%_B$)	(%)	W_a/ SbX100	6.06

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Sl. No.	I.S. Sieve size (mm)	Weight Retained (gm)	Percentage of weight Retained (%)	Cumulative Percentage of weight retained (%)	Cumulative % of Passing		Remarks
					Test Result	Gradation Limits as per MORT&H	
1	19.00	0.00	0.00	0.00	100.00	100.00	Gradation satisfies the MORT&H Grade II Specification for Bituminous Concrete
2	13.20	674.00	16.85	16.85	83.15	72-100	
3	9.50	430.00	10.75	27.60	72.40	70-88	
4	4.75	263.00	6.58	34.18	65.83	53-71	
5	2.36	478.00	11.95	46.13	53.88	42-58	
6	1.18	341.00	8.53	54.65	45.35	34-48	
7	0.60	438.00	10.95	65.60	34.40	26-38	
8	0.30	426.00	10.65	76.25	23.75	18-28	
9	0.15	380.00	9.50	85.75	14.25	12-20)	
10	0.08	364.00	9.10	94.85	5.15	(4-10)	

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